
SOA Valuation Actuary Symposium Complex Liability Modeling Issues

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SOA Valuation Actuary Symposium Complex Liability Modeling Issues

- **Non-complex liabilities**
- **Complex Liability Risks - GMDB's, VAGLB's**
- **Modeling Techniques - GMDB's, VAGLB's**
- **Realistic Dynamic Assumptions**
- **Stochastic Analysis**
- **Presenting Results**

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Complex Liability Modeling Issues

- **Non-complex Liabilities**
 - » It's the little things that sometimes bite us.
 - » Historically, loan options and credited rate floors were considered ancillary benefits.
 - » As you model the complex liabilities, don't forget the non-complex ones.

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- **Complex Liability Risks**
 - » GMDB's - ROP, Ratchet (7-yr), MAV, Rollup, EPB.
 - » Risk = F(Mkt returns, Qx), lapses also.
 - » NAR=MAV-AV
 - » NAR is leveraged. If Mkt drops 10% the NAR may increase 100%. E.g. MAV=\$110, AV=\$100.
 - » Reinsurance - Later.

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- **Complex Liability Risks**
 - » VAGLB's - GMAB, GMIB, GMWB, GPAF
 - » Risk = F(Mkt returns, usually PH behavior), lapses.
 - » Election rates (more complex than GMDB's).
 - » Little experience to date. Are these ancillary benefits or significant drivers of behavior.

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- **Modeling Techniques -GMDB**
 - » MAV GMDB - Aggregating data. Be careful.
 - » AG 34 Reserve - Significant now. 400 cells vs 1,100 cells example.
 - » Cells = AV/MAV = ...91-95%, 96-100%, 101-105%, 106-110%.....
 - » Reinsurance - Full or partial coverage, may be multiple reinsurers.
 - » Reinsurance Premiums - Seriatim NAR with min/max on AV/MAV at group level.

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- **Realistic Dynamic Assumptions**
 - » **Mkt Risk - Fat tail scenarios. How do you model changes in spreads on floating rate bonds?**
 - » **Policyholder Behavior - e.g. VA chassis used in IVA, 401, and 457 markets.**
 - » **Behavior varies by market and over time.**
 - » **What we know about behavior is that we don't know what it will be.**

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- **Stochastic Analysis**
 - » **No single scenario has any realistic chance of occurring. You get a distribution of possible results.**
 - » **You get relationships or rules of thumb. E.g. lapses may increase or decrease the GMDB risk depending on the type of benefit.**
 - » **Be sure to validate your model.**

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- **Presenting Results**
 - » **Man-From-Mars view. Audience may change.**
 - » **Graphs.**
 - » **Be careful when using present values (e.g. pricing). Look at year-to-year results over first 5 years.**
 - » **EPS volatility.**